

Preliminary Amendment

National Stage Entry of PCT/JP03/13143

Attorney Docket No.: Q87632

AMENDMENTS TO THE SPECIFICATION

Please replace the second paragraph on page 1 with the following amended paragraph:

Conventionally, for simultaneously controlling a plurality of motors by a host controller, the connection between the host controller and a servo-amplifier for driving respective shafts is electrically provided through bus connection, serial communication or the like using a communication interface device which is connected to a transmission cable (see ~~Patent Reference No. 1~~JP-A-2002-140103, for example).

Please replace the paragraph on page 1 bridging page 2 with the following amended paragraph:

Fig. 9(a) and Fig. 9(b) ~~is~~ are block diagrams showing configuration examples of the multishaft servo-amplifier used in the above case. Fig. 9(a) shows Configuration Example 1 and Fig. 9(b) shows Configuration Example 2 of the multishaft servo-amplifier. In Figs. 9(a) and 9(b), reference number 83 designates a host controller, reference numbers 84 designate communication interfaces, reference numbers 85 designate multishaft servo-amplifier modules, reference number 86 designate servo-motors, reference number 87 designates a transmission cable, reference number 88 designate bus connections or serial communication or the like, reference number 89 designate motor cables, and reference number 90 designate a multishaft servo-amplifier function unit 90.

Please replace the paragraph on page 6 bridging page 7 with the following amended paragraph:

For achieving the above object, an embodiment of the invention according to ~~claim 1~~ a first aspect provides a method for mounting a plurality of multishaft servo-amplifier modules on a multishaft servo-amplifier for driving motors, each of which modules has an identical shape and an identical function to each other and carries semiconductor power elements. In this

Preliminary Amendment

National Stage Entry of PCT/JP03/13143

Attorney Docket No.: Q87632

method: a multishaft interface substrate as a base plate on which the plural multishaft servo-amplifier modules are mounted is provided to constitute a multishaft servo-amplifier function unit for a host controller; the multishaft servo-amplifier modules are mounted on the surface of the multishaft interface substrate in parallel therewith; and the multishaft servo-amplifier modules are mounted on both the surfaces of the multishaft interface substrate to efficiently mount the plural multishaft servo-amplifier modules on the multishaft interface substrate.

Please replace the paragraph on page 7 bridging page 8 with the following amended paragraph:

In a second aspect of the invention ~~according to claim 2~~, in the method for mounting multishaft servo-amplifier modules of ~~claim 1~~ the first aspect: connectors for connecting with the multishaft interface substrate are disposed on diagonally facing areas of the multishaft servo-amplifier module, connectors for connecting with the multishaft servo-amplifier module are disposed on both the front and the rear surfaces of the multishaft interface substrate in a zigzag arrangement, and the connectors for connecting with the multishaft servo-amplifier module are alternately disposed on the front and the rear surfaces of the multishaft interface substrate such that the connectors for connecting with the multishaft servo-amplifier module do not interfere with each other; and the multishaft servo-amplifier modules are mounted on the same positions of both the surfaces of the multishaft interface substrate such that the multishaft interface substrate is sandwiched between each pair of the multishaft servo-amplifier modules, and the multishaft servo-amplifier modules are mounted on the multishaft interface substrate in a side-by-side arrangement so as to efficiently mount the plural multishaft servo-amplifier modules on the multishaft interface substrate.

Preliminary Amendment

National Stage Entry of PCT/JP03/13143

Attorney Docket No.: Q87632

Please replace the first full paragraph on page 8 with the following amended paragraph:

In a third aspect of the invention ~~according to claim 3~~, in the method for mounting multishaft servo-amplifier modules of ~~claim 1~~ the first aspect: through holes used for fixation are formed on the multishaft servo-amplifier modules to provide serially connected through holes formed by mounting the servo-amplifier modules on the same positions of both the surfaces of the multishaft interface substrate such that the multishaft interface substrate is sandwiched between each pair of the multishaft servo-amplifier modules; and the multishaft servo-amplifier modules are fixed to the multishaft interface substrate such that the multishaft interface substrate is sandwiched between the pairs of the multishaft servo-amplifier modules using the serially connected through holes thus formed.

Please replace the paragraph on page 8 bridging page 9 with the following amended paragraph:

In a fourth aspect of the invention ~~according to claim 4~~, in the method for mounting multishaft servo-amplifier modules of any one of ~~claims 1 to 3~~ the first to the third aspects: attachment flat surfaces and structures having sufficient degrees of flatness and parallelism and strength are provided for the multishaft servo-amplifier modules such that the multishaft servo-amplifier can be directly attached to and carried on a movable part of a machine with a decreased entire thickness of the multishaft servo-amplifier for the carrying surface of the movable part of the machine.

Please replace the first paragraph on page 9 with the following amended paragraph:

According to the methods of ~~claims 1 through 3~~ the first to the third aspects as described above, it is possible to mount the multishaft servo-amplifier modules on the flat surface of the base plate in parallel therewith and to efficiently mount the multishaft servo-amplifier modules on both the surfaces of the base plate. Thus, a thin type multishaft servo-amplifier having a smaller height in a thickness direction of the base plate than that of a conventional multishaft servo-amplifier is provided.

Please replace the third paragraph on page 9 with the following amended paragraph:

Additionally, according to the methods of ~~claims 1 to 4~~ the first to the fourth aspects, a multishaft servo-amplifier having enhanced resistance to vibration and shock and increased mechanical strength is provided since the thin type multishaft servo-amplifier can be carried on a carrying surface of a machine with a decreased entire thickness of the multishaft servo-amplifier for the carrying surface of the machine. Thus, a multishaft servo-amplifier which can be carried on a movable part of a machine required to move at high speed.

Please replace the paragraph on page 10 bridging page 11 with the following amended paragraph:

Fig. 1 is an isometric view illustrating an example of an entire structure of a multishaft servo-amplifier on which multishaft servo-amplifier modules are mounted by a method according to the present invention. Figs. 2(a) to 2(d) illustrate the multishaft servo-amplifier module of the invention, where Fig. 2(a) is a front view, Fig. 2(b) is a bottom view, Fig. 2(c) is a right side view and Fig. 2(d) is a back view of the multishaft servo-amplifier module. Figs. 3(a) and 3(b) illustrates a multishaft interface substrate of the invention, where Fig. 3(a) is a front view (hidden lines indicated) and Fig. 3(b) is a bottom view of the multishaft interface substrate. Fig. 4 is an exploded view of the multishaft servo-amplifier modules shown in Figs. 2(a) to 2(d) and the multishaft interface substrate shown in Figs. 3(a) and 3(b). Figs. 5(a) and 5(b) illustrates the multishaft servo-amplifier modules shown in Figs. 2(a) to 2(d) and mounted on the multishaft interface substrate shown in Figs. 3(a) and 3(b), where Fig. 5(a) is a front view (hidden lines indicated) and Fig. 5(b) is a bottom view of the modules and substrate. Fig. 6 is an isometric view of the multishaft servo-amplifier carried on a movable part of an industrial machine. Fig. 7 shows attachment positions of the movable part of the industrial machine to which the multishaft servo-amplifier is attached. Fig. 8 illustrates attachment of the multishaft servo-amplifier to the movable part of the industrial machine in detail. Figs. 9(a) and 9(b) is are block diagrams

Preliminary Amendment

National Stage Entry of PCT/JP03/13143

Attorney Docket No.: Q87632

showing examples of a multishaft servo-amplifier, where Fig. 9(a) shows Configuration Example 1 and Fig. 9(b) shows Configuration Example 2. Fig. 10 is an isometric view illustrating an example of an entire structure of a multishaft servo-amplifier on which base-mounted type multishaft servo-amplifier modules are mounted by a conventional method.

Please replace the second full paragraph on page 12 with the following amended paragraph:

Figs. 2(a) to 2(d) illustrates the multishaft servo-amplifier module unit for driving a motor, which carries semiconductor power elements. Fig. 2(a) is a front view, Fig. 2(b) is a bottom view, Fig. 2(c) is a right side view, and Fig. 2(d) is a back view of the multishaft servo-amplifier module unit.

Please replace the first full paragraph on page 14 with the following amended paragraph:

Figs. 3(a) and 3(b) illustrates a multishaft interface substrate unit also functioning as the base plate on which the plural servo-amplifier modules are mounted to constitute the multishaft servo-amplifier function unit for the host controller. Fig. 3(a) is a front view (hidden lines indicated) and Fig. 3(b) is a bottom view of the multishaft interface substrate unit.

Please replace the paragraph on page 16 bridging page 17 with the following amended paragraph:

Fig. 4 is an exploded view of the multishaft servo-amplifier modules shown in Figs. 2(a) to 2(d) and the multishaft interface substrate shown in Figs. 3(a) and 3(b). In this figure, only the multishaft servo-amplifier module 5 (fifth shaft) and the multishaft servo-amplifier module 6 (sixth shaft) are illustrated as a disassembly example.

Please replace the first paragraph on page 17 with the following amended paragraph:

Figs. 5(a) and 5(b) illustrate the six multishaft servo-amplifier modules shown in Figs. 2(a) to 2(d) which are mounted on the multishaft interface substrate shown in Figs. 3(a) and 3(b). Fig. 5(a) is a front view (hidden lines indicated) and Fig. 5(b) is a bottom view of the servo-amplifier modules.

Please replace the third paragraph on page 17 with the following amended paragraph:

The connectors 12 and 13 (both shown in Figs. 2(a) to 2(d)) carried on the multishaft servo-amplifier module 5 (fifth shaft) for connection with the multishaft interface substrate are brought into engagement with the connectors 27 and 28 (both shown in Figs. 3(a) and 3(b)), respectively, carried on the front surface of the multishaft interface substrate 7 for connection with the multishaft servo-amplifier module.

Please replace the second paragraph on page 22 with the following amended paragraph:

Fig. 8 illustrates attachment of the multishaft servo-amplifier to the mounter head 52 (a movable part of a machine). Each of the multishaft servo-amplifier module 2 (second shaft), the multishaft servo-amplifier module 4 (fourth shaft), and the multishaft servo-amplifier module 6 (sixth shaft) has the pedestal attachment flat surface 20 for attachment to a machine at the pedestal of the multishaft servo-amplifier module (see Figs. 2(a) to 2(d)). The flat surface 20 also has sufficient mechanical strength and degrees of flatness and parallelism for attachment to the movable part of the machine.

Preliminary Amendment

National Stage Entry of PCT/JP03/13143

Attorney Docket No.: Q87632

Please replace the paragraph bridging pages 22 and 23 with the following amended paragraph:

The pedestal attachment flat surface 20 of the second multishaft servo-amplifier module 2 (second shaft) for attachment to a machine is brought into surface contact with the flat surface 67 of the chip mounter for attachment to the multishaft servo-amplifier module, such that hole positions 71 through 74 for fixing the multishaft servo-amplifier module 1 (first shaft) and the multishaft servo-amplifier module 2 (second shaft) to the multishaft interface substrate 7 shown in Figs. 5(a) and 5(b) are aligned with the screw taps 54 through 57 for attaching the multishaft servo-amplifier shown in Fig. 7.